

1 WHAT IS CLAIMED IS:

2

3 1. A method for removing selenium from an aqueous stream containing
4 selenium comprising passing the aqueous stream in combination with a
5 quaternary amine compound through a filter to produce an effluent
6 which is depleted in selenium content relative to the untreated
7 selenium-containing aqueous stream.

8

9 2. The method of claim 1, wherein the aqueous stream containing
10 selenium is an oil refinery process wastewater.

11

12 3. The method of claim 1, wherein the aqueous stream containing
13 selenium is an oil refinery process wastewater containing free and
14 soluble oil.

15

16 4. The method of claim 1, wherein the filter comprises a filter media will
17 absorb or otherwise remove a quaternary amine compound from an
18 aqueous solution.

19

20 5. The method of claim 4, wherein the filter media is selected from the
21 group consisting of clay, cellulose, starch, activated carbon and their
22 mixtures.

23

24 6. The method of claim 1, wherein the aqueous stream is an oil refinery
25 stripped sour water and the primary form of the selenium is
26 selenocyanate.

27

28 7. The method of claim 1, wherein the quaternary amine compound has
29 the general formula $R^1 R^2 R^3 R^4 N^+ X^-$, where $R^1 R^2 R^3 R^4$ are the same
30 or different and are alkyl or aryl groups, and where X is an anion.

31

32 8. The method of claim 7, wherein the quaternary amine compound has
33 the general formula $R^1 R^2 R^3 R^4 N^+ X^-$, where $R^1 R^2 R^3 R^4$ are the same

- 1 or different and are selected from the group consisting of linear or
2 branched paraffins having a chain length of $C_3 - C_{30}$, and where X is a
3 halogen.
4
- 5 9. A method for removing selenium from an aqueous stream containing
6 selenium comprising passing the aqueous stream through a filter
7 comprising a filter medium in combination with a quaternary amine to
8 produce an effluent which is depleted in selenium content relative to
9 the untreated selenium-containing aqueous stream.
10
- 11 10. The method of claim 9, wherein the aqueous stream containing
12 selenium is an oil refinery process wastewater.
13
- 14 11. The method of claim 9, wherein the filter medium is present as a solid
15 sorbent.
16
- 17 12. The method of claim 9, wherein the filter media is selected from the
18 group consisting of clay, cellulose, starch, activated carbon and their
19 mixtures.
20
- 21 13. The method of claim 9, wherein the aqueous stream is an oil refinery
22 stripped sour water and the primary form of the selenium is
23 selenocyanate.
24
- 25 14. The method of claim 9, further comprising a prefiltering step.
26
- 27 15. The method of claim 9, wherein the effluent is passed through a filter
28 medium comprising activated carbon to produce a second effluent
29 which is depleted in selenium content relative to the first effluent.
30
- 31 16. The method of claim 15, wherein the second effluent is contacted by an
32 anion exchange resin to produce a third effluent which is depleted in
33 selenium content relative to the second effluent.

1 17. A method for removing selenium from an aqueous stream containing
2 selenium comprising passing the aqueous stream through a filter
3 comprising a filter medium in combination with a quaternary amine to
4 produce a first effluent which is depleted in selenium content relative to
5 the untreated selenium-containing aqueous stream; passing the first
6 effluent through a filter medium comprising activated carbon to produce
7 a second effluent which is depleted in selenium content relative to the
8 first effluent; and contacting the second effluent by an anion exchange
9 resin to produce a third effluent, which is depleted in selenium content
10 relative to the second effluent.